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PART II

DEVELOPMENT AND RESEARCH IN THE PRIVATE SECTOR*

By

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I consider this occasion as a great privilege to present a few thoughts which have occurred to me regarding the place of Development and Research in the Industries in the private sector.

Development is a predominantly technical activity for increasing productivity. It is a fact that in this country, the developmental activity in the private sector is at a low level as compared with that in the more progressive countries. It is often stated that this is due to the short-sightedness of our industrialists. What is the probable cause of such short-sightedness wherever it exists? It is of interest to examine how far it is caused by the total uncertainty of the future of the private industries, our tax structure which appears to take away a major part of the profits earned by the more efficient industrial units and the pin pricks arising from controls on almost every aspect of purchase, production and sale which act as deterrents on expansion of industries. In the interest of causing a quick rise in the standard of living, it would be good if an assessment is made of these factors and suitable changes in our industrial, financial and labour policies are effected. The expansion of industries would then get a good push on a wide front and not be limited to the few industrialists who have a flair to do this in the interest of the country in spite of all the difficulties that they would have to face. This would also help the industries to feel safe about the future and plan their developmental activities on a long range basis.

Apart from the uncertain future of the private industries, one other cause of low developmental activity is also perhaps due to the scarcity of the individuals who can effectively and successfully direct the activity. Such individuals would have to possess a good scientific background to understand within a short time the problems faced and the steps to be taken for their solution; combined with this they should be severely profit-motivated—I deliberately use the word "severely" as distinct from "intensely". Even the first requirement is difficult to find, since it involves an

optimum combination of capacity for quick understanding, deep contemplation, basic approach, generalised thinking and capacity for hard work so as to enable obtaining all possible solutions in a short time. This is particularly rendered difficult because of the fact that a good study of even a very narrow part of modern technology involves a knowledge—and sometimes a good knowledge—of many branches of science. For example, a deep study of plastics technology would involve organic chemistry, physical chemistry, chemical engineering, mechanical engineering, electrical engineering, strength of materials and even some aspects of biology. The profit motive aspect again involves capacity for objective assessment and optimisation for taking a decision between the various alternatives. One should *severely* resist the temptation of choosing the alternatives having only the great potentialities of bringing about notable fundamental advances which would help the scientist to get a greater fame, but would not materially add to the profits.

*Presidential address at the Annual General meeting of the Institution of Chemists (India) held on January 15, 1968.

As far as research is concerned, whether it be sponsored or carried out by the industry, it would be naturally limited to as an aid to the developmental activity and to the extent to which it enhances productivity.

Development and research are of special importance in chemical industries. This is particularly because, innovation is very fast and frequent in this field. Often chemical processes and operations become obsolete in the course of five years to ten years. Even the product may get obsolete. It is therefore necessary to keep awatch and look into the future and get ready to respond successfully to the challenge of change. In developing countries this is all the more necessary, to avoid dependance for innovations on foreign know-how. In fact, the time has come to build up on the imported know-how and export the improved know-how. We should follow Japan in this respect.

Development and research also helps in getting a monopoly of important technical information which enables one to get a vantage over the other competitive producers.

It is often the case that chemical industries are based on starting materials which are products produced by other manufacturers. In such cases it is of interest to include in the developmental activity, the production of such materials not only for captive use but also for supplying to others. This would often result in an enhancement of the overall economy and make the industry more self-reliant.

It is also of interest to consider setting up of consumer industries based on the products or intermediates produced in the factory as raw materials. Ready utilisation of product is a help to the mother industry. Ready availability of the main starting material is a great advantage to the daughter industry.

The factory is often faced with ad hoc problems peculiar to itself. These can be conveniently looked into by the development group. These problems particularly come up when important modifications are introduced in the technique. As an example I would state that a new and improved form of a commercial electrolyser for producing hydrogen gave rise to a mysterious corrosion of iron cathodes in alkali. The corrosion was mysterious because, iron is normally

resistant to alkali; a cathodic polarisation would normally be expected to stop what little tendency there might be to corrode. The solution of this problem was not possible by the foreign suppliers of the electrolyser as they viewed it on the well-beaten tracks. This was taken up by us (Sri S. R. Rajagopalan, Sri S. Sampath and myself) and by a fundamental examination of the problem, the corrosion was traced to the phenomenon of 'Cathodic depassivation' and was conclusively established by crucial experiments. The remedy also, became clear. Similarly in an amalgam type of chlor-alkali cell having cathode pools, several explosions took place due to crystallisation of the solute below the mercury. The transfer of solution below the flowing mercury was a mystery till recently. We (Kumari K. S. Indira and myself) have now established that such movement can occur due to a phenomenon known as "Wedge Effect" which has been studied by us and the cause has been established. We have also got at the way of positively preventing the creeping of the electrolyte to the cathode pools. It is now clear to us that this is also the main cause of frequent failure of leads in electrolytic cells for aluminium production and can be avoided or at least minimised by taking steps to avoid the wedge effect.

The development and research group can also take up improvements in processes and operations or even replacement of processes, if these involve novel approaches. In case the modified processes are standard processes already developed elsewhere, it may sometimes be advantageous to purchase such a process rather than start to work from a scratch. With a novel process however we would have a start over the rest of the world and therefore we may work the process successfully competing with other producers. I would mention in this connection the new type of porous carbon electrodes developed by us (Sri A. K. Waheed, Dr. K. V. N. Rao and myself), which is now being worked successfully by a party (Carbon Industries Private Limited in India. Another line of activity would be to work on the utilisation of wastes which often present the problem of disposal.

Apart from these, the development group should also undertake a survey of possible new projects which can be taken up with the advantage of a good return.

It is of interest to note that the presence of a well developed development group puts a firm or even the country in a vantage position to get foreign collaboration on reasonable terms. As an example I would cite the case of infant food. At one time, none of the foreign manufacturers agreed to set up a factory in our country, presumably since their margin of profit would be affected. A working out of a process by the Central Food Technological Research Institute under the direction of Dr. V. Subramanian, however changed the situation, and many foreign manufacturers came forth with their proposals. The process worked out by the Institute is now being exploited on a considerable scale saving substantial amount of foreign exchange. To cite another case, a firm with foreign interests came with a proposal to produce a chemical on the basis of a foreign know-how costing about a crore of rupees. Since work was already done successfully on the product though on a small scale, we (at Central Electrochemical Research Institute) opposed this proposal. It is interesting to note the salutary effect that this had. The firm has stated now that the process know-how is being obtained free. Thus even the development

on a small scale has been able to save about a crore of rupees of foreign exchange to the country, in this case.

In conclusion, I would only state that the continuous developmental and research activity is the only way to ensure a vantage position over the other competitive producers and to ensure the capacity to adapt the activity of the company to the changed circumstances regarding government policies, raw material and product markets and obsolescence of technology and to take early advantage of new discoveries in science and technology as well as to make one's own contribution to such advances. It is good that our Government has taken a step in the right direction in providing for development rebate. But this does not go far enough. I would therefore appeal to the Government to take bold steps to modify our policies so as to encourage reinvestment of profits in industry on a wide front. This would help the industries to expand the development and research activity to the country's over-all advantage.

Whereas the normal developmental work does not have the type of excitement involved in discovering new and striking phenomena or revolutionary theories or making precision measurements, it has its own type of excitement and involves a highest type of challenge to one's intellectual capacity to develop and use techniques for obtaining and handling a wide variety of information, to examine, study, assess the input and output in each case, optimise, decide priorities, programme, execute, review and achieve the objective. A success leads to a dual sense of fulfilment — first the joy of discovering the most optimal path of using the available resources of men, money and materials and secondly contributing towards the noble cause of obtaining a higher standard of living to our fellow-men.

While I lay down my office as President, it is my pleasant duty to wish the Institution, enhanced activity in future years to serve the cause of the Profession of Chemistry.

Proceedings of the Annual General Meeting

The fortieth Annual General Meeting of the Institution of Chemists (India) was held on Monday the 15th January, 1968 in the Lecture Theatre of the School of Tropical Medicine, Calcutta. The President, Professor K. S. G. Doss intimated his inability to attend the meeting. Dr. U. P. Basu, a Past-President was in the Chair. The meeting was attended by a large number of members and some visitors.

At the out set all stood in silence for a minute to condole the death of Prof. J. K. Chowdhury, Dr. H. R. Nanji, Dr. Sarju Prasad and Dr. Baradananda Chatterjee all of whom were eminent Chemists and associated with this Institution for a long period.

1. The Annual Report of the Institution for the year 1966-67 and the Audited Accounts for the financial year 1966-67 were presented at the meeting by the Honorary Secretary, Professor R. N. Chakravarti. A lively discussion ensued. Proposed by Shri S. Bhattacharyya and seconded by Dr. B. N. Dutta these were unanimously adopted by the members present with acclamation.

2. The Budget Estimate for the financial year 1968-69 as recommended by the Council was placed by the Secretary before the members present for consideration.

Proposed by Dr. B. N. Dutta and seconded by Dr. S. Bose it was unanimously passed by the members present.

3. It was announced by the Secretary that the Board of Adjudicators for award of the Cooper Memorial Medal for 1966, consisting of Prof. S.M. Sethna, Prof. N. K. Dutta and Dr. D. L. Shrivastava selected the paper entitled "Studies on 4-Hydroxy Coumarins" by A. K. Panigrahi, P. K. Jesthi, and M. K. Rout published in the Journal of the Institution in 1966 Pages 17-23 as the best paper published in the Journal in that year. Accordingly it was decided by the Council to award the Cooper Memorial Medal for 1966 to the senior most author, Prof. M. K. Rout, D. Sc., Ph. D., F. I. C. As Dr. Rout was absent, the medal was received from the Chairman by the Secretary on behalf of Prof. Rout.

4. It was reported by the Secretary that 199 candidates paid up their fees for the A. I. O. Examination 1967, of which 129 candidates appeared at the Examination. The following 76 candidates were declared to have passed the Examination (in order of merit)

Order merit.	Roll No.	Regd. No.	Name & Place.	Sections.
1	79	666714	Shri Indu Bhusan Pal, Dhanbad.	1 & 7
2	12	646571	Shri Aditya Kumar Ghosh, Dhanbad.	1 & 7
3	10	646568	Shri Radha Raman Sinha, Patna.	3 & 6
4	6	646543	Shri V. P. Sharma, Delhi.	1 & 4
5	179	6667201	Shri Pradip Kumar Basu, Burdwan.	1 & 7
6	8	646560	Shri Kalyan Das Gupta, Calcutta.	3 & 6
7	13	646576	Shri Samarendra Nath Sarkar, Calcutta	3 & 5
	138	6667122	Shri M. R. Grover, Calcutta.	3 & 6
	191	6667236	Shri G. Balasubrahmanynm, Madras	2 & 3
10	17	6465119	Shri M. R. Ochookalingam, Madras.	4 & 9
11	114	6667153	Shri Bijan Behari Sinha, Dhanbad.	1 & 7
12	81	666717	Shri Prabodh Chandra Bhattacharyya, Durgapur.	1 & 7
13	87	666725	Shri R. Anantha Krishnan, Calcutta.	1 & 4
14	115	666778	Sm. K. A. Vijaylakshmi, Madras.	3 & 4
15	48	6566115	Shri Mani Lal Bandyopadhyay, Jamshedpur.	1 & 7
16	93	666738	Shri Arbind Sankar, Sindri.	4 & 7
	106	666760	Shri Prabodh Chandra Roy Chowdhury, Raniganj.	4 & 6
18	41	656691	Shri V. S. Sabnis, Kolhapur.	3 & 5
19	49	6566119	Shri M. Devadoss, Madras.	1 & 4
	122	666794	Shri S. N. Pandit, Lucknow.	4 & 8
21	185	6667219	Shri M. R. Balakrishnan, Varanasi.	1 & 7
22	152	6667149	Shri P. S. Krishnan, Madras.	3 & 6

Order Roll Regd. No.			Name and Place.	Sections
Merit. No.				
23	101	666753	Shri S. R. Nayak, Bombay.	2 & 5
24	83	666719	Shri Amar Pal, (Sharma), Singhbhum.	1 & 8
25	26	656610	Shri Ajit Kumar Sinha, Monghyr.	4 & 7
26	150	6667146	Sanat Kumar Chatterjee, Calcutta.	2 & 5
27	127	666799	Shri Netai Sundar Datta, Howrah	1 & 8
28	61	6566172	Shri R. S Sharma, Patiala.	4 & 7
29	78	666712	Shri Pitabas Das, Burdwan.	1 & 7
	168	6667183	Shri Ajit Kumar Roy, Calcutta.	3 & 4
31	125	666797	Shri Baidya Nath Ghosh, Calcutta.	1 & 7
32	60	6566164	Mrs. H. Sumathi Venayagam, Hyderabad.	4 & 6
33	69	6566203	Shri Pradip Kumar Bhattacharjee, Calcutta.	4 & 8
	134	6667109	Shri S. Venkatesan, Karaikudi.	1 & 4
35	52	6566132	Shri P. Thyagarajan, Madras.	4 and 8
36	9	646566	Shri Dharampaul Sharma, Hoshiarpur.	1 and 4
37	147	6667136	Shri B. L. Pareek, Nagpur.	4 and 8
38	92	666737	Shri J. P. Ganatra, Baroda.	2 and 3
39	198	6667247	Shri Aloke Kumar Nandi, Ranchi.	1 and 7
40	126	666798	Shri Santosh Kumar Karak, Calcutta.	4 and 8
41	85	666721	Shri Sushanta Kumar Bhattachali, Rourkela.	4 and 7
42	89	666728	Shri Arun Kanti Chakravarti, 24-Parganas.	1 and 4
43	104	666756	Shri Dilip Kumar Indra, Calcutta.	1 and 4
44	5	646539	Shri. S. B. Deshmukh, Nagpur.	4 and 8
45	27	656616	Shri Achyut Kumar Biswas, Calcutta.	1 and 4
46	199	666733	Sm. S. Varani, Madras.	1 and 6
47	142	6667130	Shri Rabindra Nath Kar, Calcutta.	2 and 5
48	70	6566206	Shri Nekhilesh Chatterjee, Calcutta.	2 and 5
49	72	66671	Shri Samir Kumer Mukherjee, Durgapur.	1 and 4
	117	666785	Shri J. G. Trivedi, Baroda.	2 and 3
51	97	666742	Shri P. K. Sudhir, New Delhi.	3 and 6
52	99	666745	Shri Pashupati Mistri, Dhanbad.	4 and 7
53	71	6566212	Shri M. L. Dutta Gupta, New Delhi.	3 and 6
54	110	666765	Shri M. A. Majeed, Hyderabad.	2 and 6
55	7	646545	Shri V. J. Banavalikar, Bombay.	2 and 6
56	21	6465133	Shri Kiriti Kumar Roy Chowdhury, Bilaspur.	1 and 7
	98	666743	Shri Raghupati Kaushik, Patiala.	4 and 5
58	182	6667208	Shri R. K. Pattansayak, Orissa.	1 and 7
59	20	6465132	Shri Sudhansu Kumar Chakravarti, Bilaspur.	1 and 7
60	151	6667147	Shri Satish J. Rao, Poona.	3 and 6

Order Roll Merit. No.	Regd No.	Name and Place.	Sections
176	6667194	Shri B. N. Dixit, Kanpur.	3 and 6
62 131	6667103	Shri R. U. Chawdhury, Singbhum.	1 and 4
63 145	6667134	Shri K. V. Ramadas, Hyderabad.	1 and 6
64 80	666715	Shri C. S. Ramakrishna Rao, Nagpur.	1 and 4
65 196	6667245	Shri G. S. Sarpabhushana, Bangalore	2 and 6
66 137	6667121	Shri Chanchal Ghosh, Howrah.	1 and 8
67 28	656617	Shri G. Naga Murthy, Hyderabad.	4 and 5
68 118	666786	Miss. Indira Vissa, Hyderabad.	2 and 9
69 132	6667104	Shri Kanu Lal Bhattacharjee, Jorhat.	1 and 7
114	666774	Shri V. Kothandaraman, Ahmedabad.	4 and 8
180	6667203	Shri S. F. Lokhandwalla, Bombay.	1 and 7
185	6667179	Miss. Pramila M. Parikh, Baroda.	2 and 3
164	6667178	Shri P. B. Saran, Patna,	6 and 9
188	6667226	Shri Vijoy Kumar Sett, Karnal.	3 and 5
111	666766	Shri Jasbir Singh Bakshi, New Delhi.	3 and 6
15	646595	Shri Venkataraman, Jamshedpur.	1 and 7

It was recommended by the Council that the Capt. N. N. Dutta Medal for 1967 and the cash prize be awarded to Shri Indu Bhusan Pal, Dhanbad, the most successful candidate for 1967.

5. The Capt. N. N. Dutta Medal for 1966 and the cash prize Rs. 200/-were awarded by the Chairman with acclamation to Shri Asoke Ranjan Das, Hooghly, the most successful candidate at the A. I. C. Examination, 1966.

6. It was unanimously resolved that Messrs. Pal & Roy, Chartered Accountants, 2, Church Lane, Calcutta be appointed Honorary Auditors of the Institution for the financial year 1967-68.

7. The names of the Council Members and Office Bearers for 1968 were announced as follows :—

President.

Shri B. Maitra, M. Sc., F. I. C., Calcutta.

Past President.

K. N. Bagchi, B. Sc., M. B., D. T. M., F. R. I. C., F. N. I., Calcutta.

U. P. Basu, D. Sc., P. R. S., F. I. C., F. N. I., Calcutta.

K. A. Hamied, M. A. Ph. D. (Berlin), F. R. I. C., F. I. C., Bombay.

J. N. Mukherjee, D. Sc., F. A. S., F. N. I., Calcutta.

Past President.

- Mata Prasad, D. Sc., F. R. I. C., F. I. C., F. N. I., Agra.
 Atma Ram, D. Sc., F. I. C., F. N. I., New Delhi.
 V. Subrahmanyam, D. Sc., F. R. I. C., F. I. C., F. N. I., Mysore.
 S. Husin Zaheer, M. A. (Oxon). D. Phil. Nat., F. I. C., New Delhi.
 K. S. G. Doss, D. Sc., F. R. I. C., F. N. I., Karaikudi.

Vice-Presidents.

- G. M. Nabar, Ph. D., F. R. I. C., F. T. I., F. I. C., Bombay.
 B. Prasad, D. Sc. (Lond.), F. I. C., F. N. I., Allahabad.
 Sadgopal, D. Sc., F. R. I. C., F. I. C., New Delhi.
 M. L. Schroff, A. B., M. S., F. I. C. Calcutta.
 N. K. Sen, D. Sc., F. R. I. C., F. I. C., F. N. I., Calcutta.

Honorary Treasurer

- R. G. Chatterjee. D. Sc., D. I. C. (Lond.), Calcutta.

Honorary Secretary

- R. N. Chakravarti, D. Sc., P. R. S., F. R. I. C., F. I. C., F. N. I., Calcutta.

Honorary Joint Secretary

- D. Chakravarti, Ph. D., A. B. I. C., F. I. C., Calcutta.

Honorary Assistant Secretary

- A. B. Dutta, B. Sc., A. I. C., Calcutta.

Other Members of the Council.

- N. G. Basak, M. Sc., D. Phil., F. I. C., Jealgora.
 J. N. Chatterjee, D. Sc., D. Phil (Oxon), F. I. C., Patna.
 S. K. Chatterjee, Ph. D., F. I. C., Calcutta.
 B. N. Dutta, M. Sc., D. Phil., F. I. C., Calcutta.
 N. K. Dutta, D. Sc., F. R. I. C., F. I. C., Calcutta.
 Y. K. Hamied, M. A., Ph. D., F. I. C., Bombay.
 B. N. Mehta, M. Sc., A. H. B. T. I., Bhuj-Katch.
 S. C. Chakravarti, M. Sc., D. Phil., F. I. C., Calcutta.
 A. R. Natarajan, M. B. B. S., D. E. L. M. Sc., (Lond.), D. I. C., F. R. I. C. F. I. C., Madras.

Other Members of the Council.

M. K. Rout, D. Sc. Ph. D., F. I. C., Cuttack.
M. L. Seth, M. Sc. (Tech), F. I. C., New Delhi.
N. M. Saha, M. Sc., Ph. D., F. I. C., Ahmedabad.
D. L. Shrivastava, D. Sc., F. I. C. Calcutta.
D. C. Tapadar, M. Sc., D. Phil., F. I. C., F. R. I. C., 24-Parganas.
Secretary, Ministry of Education, Government of India, New Delhi

Editor.

S. N. Mitra, M. Sc. (Lond.), D. I. C., F. R. I. C., F. I. C., Calcutta.

Associate Editor.

S. C. Chakravarti, M. Sc., D. Phil., F. I. C.
R. N. Dutta, M. Sc., D. Phil., F. I. C.
N. K. Dutta, D. Sc., F. I. C.

Honorary Auditors.

Pal & Roy, Chartered Accountants, Calcutta.

Associateship Examination Sub-Committee.

Dr. S. C. Chakravarti,
Prof. N. K. Dutta,
Dr. G. C. Esh,
Shri S. N. Mitra,
Dr. A. R. Natarajan,
Dr. M. K. Rout,
Dr. N. K. Sen,

The President, The Honorary Secretary and the Honorary Treasurer being ex-officio members. Dr. R. N. Chakravarti, Honorary Secretary to act as the Convener.

Fellowship/Associateship (Without Examination) Sub-Committee.

Dr. U. P. Basu,
Dr. M. L. Dhar,
Dr. B. Prasad,
Dr. D. L. Shrivastava,
Dr. Sadgopal,

The President, the Honorary Secretary and the Honorary Treasurer being ex officio members.

Editorial Board.

Dr. A. N. Bose,
Dr. (Mrs.) Chakravarti,
Dr. M. Q. Doja,
Dr. Baidya Nath Ghosh,
Dr. J. B. Lal,
Dr. S. C. Niyogi,
Dr. S. M. Sethna,
Prof. M. L. Schroff and
Dr. N. S. Wariyar.

Publication Committee.

Dr. D. Chakravarti and
Dr. S. K. Dutta.

The President, the Honorary Secretary, the Honorary Treasurer, the Editor, the Associate Editors being ex-officio members.

8. F. I. C./ A. I. C. Diploma were awarded by the Chairman to various new fellows and Associates.

9. In the absence of the President, the Presidential Address on "Development and Research in the Private Sector" was presented by the Secretary.

At the termination of the meeting a vote of thanks to the Chair, the members present and the authorities of the School of Tropical Medicine was proposed by Dr. D Chakravarti, Joint Secretary.

Sd/R.N. Chakravarti
Honorary Secretary

Sd/U. P. Basu
Chairman

REGISTRATION FOR A. I. C.

The following Candidates have been registered for the A. I. C. Examination 1968. It may be noted that all the Candidates who registered their names for 1966 and 1967 Examinations are also permitted to appear at the 1968 Examination. All Candidates are advised to keep in touch with issues of the Journal and the Proceedings of the institution of chemists (India) for further announcement for the forthcoming Examination and to note that the last date for submitting the Examination Fees for 1968 A. I. C. Examination is 31st May, 1968. They are also advised to contact the office of the Institution of Chemists (India) in case they receive no intimation regarding the Programme for the Examination even by the middle of September, 1968.

Regd. No.	Names.	Sections.
67681	Shri V, A, Vazirani, Bombay,	2 & 6
67682	Shri Sham Kumar Rampal, New Delhi,	3 & 6
67683	Shri Anil Kamar Das, Dhanbad,	4 & 7
67684	Shri S, K, Chhibber, Dehra Dun,	4 & 7
67685	Shri K, Sundareshan, Bangalore,	3 & 5
67686	Shri S, K, Despande, Poona,	4 & 6
67687	Shri Surjeet Lal, Meerut,	3 & 4
67688	Shri D, Jayant Kumar, Hyderabad,	2 & 6
67689	Shri Lajinder Singh, New Delhi,	3 & 6
676810	Shri K, Hariharan, Mysore,	3 & 5
676811	Shri Prafulla Ranjan Sarkar, Sundergarh,	4 & 7
676812	Shri K, C, Geevarghese, Kerala,	4 & 8
676813	Shri Swarn Singh Udehan, Ohandigarah,	2 & 3
676814	Shri Satya Brata Basu, Dhanbad,	1 & 7
676815	Shri Ram Prakash Porwal, Lucknow,	1 & 4
676816	Sm, S, Krishnamba, Trivandrum,	3 & 6
676817	Shri Ram Prashad Gupta, Delhi,	3 & 5
676818	Shri M, J, John, Secunderabad,	3 & 5
676819	Sm, M, D, Telong, Bhavanagar,	4 & 8
676820	Shri R, S, Agarwal, Kota,	4 & 6
676821	Shri Naresh Chandra Atreya, Patiala,	4 & 5
676122	Shri Jitendra Krishna Paul, Calcutta,	3 & 4
676823	Shri A Kesava Menon, Sibsagar,	4 & 8
676824	Shri R, Rajagopalan, Neyveli,	4 & 7

Regd. No.	Names.	Sections.
676825	Shri Sasthipada Kumar, Hoogly.	4 & 7
676826	Shri Lalit Mohan Chakravarty, Assam	4 & 7
676827	Shri T, K, Paul, Assam.	4 & 8
676828	Shri R, B. Baiswara, Nagpur,	1 & 6
676829	Shri K, Murali Mohan, Guntur,	4 & 6
676830	Shri K, D, Seth, Bombay	1 & 4
676831	Shri Bibhuti Bhusan De, Calcutta,	1 & 4
676832	Shri Bansa Gopal Chatterjee, Durgapur	1 & 6
676833	Shri A, Narayanan, Hyderabad	1 & 6
676834	Shri Dhanraj Sunerha, Hyderabad,	3 & 6
676835	Shri Raj Kumar Dhand, Rupa	1 & 4
676836	Shri K, C, Mehta, Ahmedabad,	3 & 5
676837	Shri R, Venkatasubramanian, Madras,	1 & 6
676838	Shri D, K, Raju, Hyderabad,	2 & 6
676839	Shri Somnath Banerjee, Dhanbad	1 & 7
676840	Shri Subhransu Bhushan Dutta, Burdwan,	1 & 6
676841	Shri Biwanath Dalal, Dhanbad,	1 & 7
676842	Shri Mohan Lal Ahuja, New Delhi	2 & 5
676843	Shri H, K, Nagaraja Mysore	3 & 5
676844	Shri Shiv Kumar, Ghaziabad.	3 and 6
676845	Shri Ashru Kumar Mukherjee, Surat.	1 and 8
676846	Shri D. P. Thakur, Baroda.	2 and 5
676847	Shri Asit Kumar Das Gupta, Midnapore.	1 and 6
676848	Shri Awtar Singh Dhani, New Delhi.	4 and 6
676849	Shri Parimal Kanti Guha, Rancho.	1 and 7
676850	Shri Parimal Chimanlal Saah, Baroda.	2 and 3
676851	Shri K. P. Ananda Prakash, Poona.	1 and 5
676852	Shri Ch. Chinnaiah, Rourkela.	4 and 7
676853	Shri M. J. Devaraj, Mysore.	3 and 8
676854	Shri Bhushan Lal Parasher, Jorhat.	4 and 8
676855	Shri Mahadeb O. Bandopadhyay, Burdwan.	1 and 7
676856	Shri Sumer Chand Jain, New Delhi.	4 and 8
676857	Shri Prashant kumar Gaur. Rourkela.	4 and 7
676858	Shri Vishnu Dutt Sharma, Dehra Dum.	4 and 8
676859	Shri Krishna Samnol, Faridabad.	4 and 7
676860	Shri P. L. Joshi, Junagadh.	5 and 9
676861	Shri S. A. Vengsarkar, Bombay.	2 and 6
676862	Shri Mukul Ranjan Saha, Dhanbad.	1 and 7
676863	Shri Priya Bondhu Chowdhury, Dhanbad.	1 and 7

Regd. No.	Names.	Sections.
676864	Shri B. Seetarama Rao, Poona.	2 and 5
676865	Shri Vijay Kumar Jain, Baroda.	4 and 8
676866	Shri O. K. O. Mahapatra, Cuttack.	2 and 3
676867	Shri E. Vikraman, Jamshedpur.	1 and 7
676868	Shri J. M. Kolhatkar, Baroda.	3 and 4
676869	Shri Sridhar Bandyopadhyay, Calcutta.	1 and 7
676870	Shri Samir Kumar Basu, Calcutta.	1 and 7
676871	Shri Nirmal Kumar Chakravarti, Calcutta.	1 and 7
676872	Shri Jagadish Chandra Ghosh, Calcutta.	2 and 5
676873	Shri Dipak Kumar Sen Gupta, Hazaribagh.	1 and 4
676874	Shri Samarendra Bikram Das, Hazaribagh.	1 and 4
676875	Shri K. R. Krishnasastri, Karnool.	4 and 5
676876	Shri k. Raman, Neyveli.	4 and 7
676877	Shri V. Viswanathan, Neyveli.	4 and 7
676878	Shri H. N. Saxena, Baroda.	4 and 6
676879	Shri Radhe Sham Sharma, Hosierpur.	4 and 8
676880	Shri V. Gopalakrishna, Tiruchirapalli.	4 and 5
676881	Shri P. k. Unnikrishna Pillai, Poona.	1 and 4
676882	Shri Dalpat Singh Bolya, Jhunjhunu.	1 and 4
676883	Sm. T. R. Kamala, Madras.	4 and 9
676884	Shri Subhash Ch. Chaturvedi, Durg.	4 and 8
676885	Shri S. Satyanath, Bangalore.	2 and 6
676886	Shri Y. V. Subrahmanyam, Poona.	1 and 6
676887	Shri Vijay Kumar Raine, Srinagar.	2 and 8
676888	Shri Bimal Chandra Dey, Calcutta.	2 and 3
676889	Shri Iqbal Husain, Hyderabad.	2 and 6
676890	Shri Bansi Lal Gulati, Sholapur.	1 and 8
676891	Shri N. N. Wahi, Roorkee.	3 and 6
676892	Shri Bhagirath Mondal, Calcutta.	4 and 5
676893	Shri S. F. Fish, Dehra Dun.	4 and 7
676894	Shri M. S. Olaniya, Jaipur.	3 and 4

Regd. No.	Names.	Sections.
676895	Shri P. R. Ramaswamy, Bombay.	2 and 6
676896	Shri K. Ramamurthy, Hyderabad.	2 and 3
676897	Sm. Veena Sekhri, Poona.	1 and 6
676898	Sm. M. Indumani Yogi, Poona.	1 and 6
676899	Sm. Sayeeda Sami, Hyderabad.	2 and 6
6768100	MD. Sanwar Hussain Molla, Calcutta.	4 and 8
6768101	Shri K. Gurumurty, Bombay.	3 and 5
6768102	Shri A. R. Narasimha Murty, Srikakulam.	1 and 4
6768103	Shri Amulya Kumar Baruah, Sibsagar.	4 and 7
6768104	Shri Bisheswar Prasad, Sindri.	4 and 7
6768105	Shri Badha Charan Dixit, Delhi.	1 and 4
6768106	Shri A. P. Muley, Nagpur.	1 and 4
6768107	Shri P. V. Varughese, Rourkela.	4 and 7
6768108	Shri M. K. Achuthan kutty, Calcutta.	4 and 8
6768109	Shri Rabindra Nath Ray, Calcutta,	1 and 8
6768110	Shri N. K. Verma, Ranchi.	1 and 7
6768111	Shri Bachoo Prasad, Patna.	3 and 6
6768112	Shri Shatrughna Jha, Sibsagar.	4 and 8
6768113	Shri Dinesh Chandra Mitra, Dhanbad	1 and 7
6768114	Shri Siba Prasad Ghose, Dhanbad.	1 and 7
6768115	Shri Prabhakar Tripathy, Puri.	3 and 4
6768116	Shri C. V. Dave, Anand.	3 and 6
6768117	Shri Man Mohan kumar kwatra, Delhi.	3 and 6
6768118	Shri T. E. Natarajan, Madras.	8 and 10
6768119	Shri Vijay kumar Mehta, Jammu.	2 and 6
6768120	Shri Ranji Lal, Varanasi.	4 and 8
6768121	Sm. Zakia Farid, Hyderabad.	3 and 6
6768122	Shri Satyendra Nath Mukherjee, Dhanbad.	1 and 7
6768123	Shri Arun kanti Chaudhuri, Dhanbad.	1 and 7
6768124	Shri R. S. Mangalvedhe, Bangalore.	2 and 6
6768125	Shri B. M. Kulkarni, Nagpur.	3 and 6
6768126	Shri Phani Bhusan Chatterjee, Jamshedpur.	1 and 7

Regd. No.	Names.	Sections.
6768127	Shri Karuna Kar Padhi, Jamshedpur.	1 and 7
6768128	Shri Hare Ram Dubey, Bhagalpur.	4 and 8
6768129	Shri Ashim Kumar Chakraborty, Ranchi	1 and 7
6768130	Shri Raj Kishore Prasad Singh, Ranchi.	1 and 7
6768131	Shri Sisir Kumar Das, Bhagalpur.	1 and 8
6768132	Shri Y. S. Kaushikkar, Nagpur.	1 and 7
6768133	Shri M. V. Gaonkar, Bombay.	2 and 6
6768134	Shri B. P. Tiwari, Bilaspur.	1 and 7
6768135	Shri T. Chandra Sekhar Rao, Hyderabad.	4 and 6
6768136	Shri Harish Prasad Mathur, Jhunjhunu.	1 and 4
6768137	Shri Sambhu Nath Saha, Calcutta.	1 and 8
6768138	Shri Raj Kumar Singh, Lucknow.	2 and 6
6768139	Shri G. K. Viswanadha Rao, Hyderabad.	4 and 6
6768140	Sm. K. Sumalini, Hyderabad.	2 and 6
6768141	Shri Jai Perakash Narain, Chaziabad.	3 and 6
6768142	Shri kamal kishore Bhatnagar, Poona.	3 and 6
6768143	Shri Ram Sunder Lal Towari, Gauhati.	1 and 4
6768144	Shri Prem Chandra Basu, Calcutta.	3 and 4
6768145	Shri Ram Narain Nigam, Dehra Dun.	4 and 7
6768146	Shri Bijay Kumor Maiti, Calcutta.	3 and 4
6768147	Shri Pradyot kanti Dutta, Delhi.	1 and 4
6768148	Shri N. Rajamony Pandichery.	6 and 11
6768149	Shri S. M. B. Pisharidy, Poona.	2 and 6
6768150	Shri Ved Prakash Gupta, Delhi	2 and 6
6768151	Shri Buddhadev Mukherjee, Dhanbad	4 and 7
6768152	Shri Dilip Kumar Roy, Dhanbad.	1 and 7
6768153	Shri P. S Laxman, Visakhapatnam.	4 and 8
6768154	Shri Supriya Kumar Dutta, Dhanbad.	1 and 7
6768155	Sm. Suneethi Moses, Hyderabad.	2 and 6
6768156	Shri S. Balasubramanian, Neyveli.	4 and 7
6768157	Shri M. S. Ratra, Dhera Dun.	4 and 7
6768158	Shri Dharmendra Swarup, New Delhi.	4 and 6

Regd. No.	Names.	Sections.
6768159	Shri S. V. K. Dilawar, Dehradun.	4 and 7
6768160	Shri Manoranjan Ghatak, Burdwan.	1 and 7
6768161	Shri O. M. Patel, Baroda.	4 and 8
6768162	Shri A. Balasubramanian, Neyveli.	4 and 7
6768163	Shri Madhab Chandra Chakraborty, Burdwan	1 and 7
6768164	Shri R. T. Kannappa, Madras,	1 and 8
6768165	Shri Sunil Kumar Roy, Dhanbad.	1 and 7
6768166	Shri K. R. Suryanarayana Rao, Bangalore.	4 and 5
6768167	Shri Hemendra Majumdar, Calcutta.	1 and 4
6768168	Shri Bipin Chandra Chaudhuri, Kanpur.	3 and 6
6768169	Shri Satish Chandra, Kanpur.	3 and 6
6768170	Shri Govind Narain Bhargava, Jaipur.	4 and 8
6768171	Shri Bidi Raghavendra Rao, Bangalore.	3 and 4
6768172	Shri Vishnu Kumar Gupta, Jaipur.	1 and 4
6768173	Shri Kapil Deo Prasad, Sabour.	4 and 8
6768174	Shri S. Vibhakar, Mysore.	3 and 5
6768175	Sm. Gunwanti Mullick, New Delhi.	3 and 5
6768176	Shri Ananth Reddy, Hyderabad.	2 and 6
6768177	Shri V. O. Patal, Kaira.	3 and 4
6768178	Shri Jamna Dass Seth, Virbhadra.	2 and 6
6768179	Shri Satya Murty, Madras.	3 and 6
6768180	Shri Ramesh Chandra Shrivastav, Virbhadra.	2 and 6
6768181	Shri V. N. Kalyanakrishana, Bangalore.	2 and 3
6768182	Shri C. S. Raghavendra Rao, Nilgiris.	4 and 9
6768183	Shri M. Laxmana Rao, Vijayawada	1 and 4
6768184	Shri Jyoti Ranjan Ray, Bhubaneswar.	2 and 3
6768185	Shri Prodyot Kumar Sarker, Dhanbad.	1 and 7
6768186	Shri Mir Hyder Ali, Hyderabad.	4 and 8
6768187	Shri Kshitindra Nath Sinha, Rourkela.	4 and 7
6768188	Shri Pundaleeka Rao, Bangalore.	2 and 6
6768189	Shri Samir Kumar Sarker, Calcutta,	4 and 5
6768190	Shri Arun Prakes Kundu, Dhanbad.	1 and 7
6768191	Shri H. H. Paul, Raipur.	1 and 4

Regd. No.	Names.	Sections.
6768192	Shri Prasanta Kumar Majumder, Dhanbad	1 and 7
6768193	Shri Avtar Singh Shinh, Chandigarh	5 and 9
6768194	Shri S. Thiagarajan, Neyveli.	4 and 7
6768195	Shri S. Rajaiah, Hyderabad	2 and 7
6768196	Shri Ashit Kumar Paul, Ranchi.	1 and 7
6768197	Shri Salil Kumar Chakraborty, Ranchi.	1 and 7
6768198	Shri M. K. Kuriakose, Kerala.	4 and 8
6768199	Shri Amiya Kumar Dhar, Dhanbad.	4 and 7
6768200	Shri L. M. Mothghare, Nagpur.	4 and 8
6768201	Shri N. Krishna Sarma, Neyveli.	4 and 7
6768202	Shri Prodeep Kumar Sen, New Delhi.	3 and 6
6768203	Shri Bijan Bihari Pal, Dhanbad.	4 and 7
6768204	Shri N. S. Venkataramani, Neyveli.	1 and 7
6768205	Shri D. S. Chandrasekaran, Madras.	3 and 6
6768206	Shri Sheo Sankar Prasad, Sahabad	1 and 7
6768207	Shri Madan Mohon Malhotra, New Delhi.	1 and 6
6768208	Shri C. O. Johnson, Delhi.	3 and 6
6768209	Shri T. Muthukumara Swamy, Madras.	3 and 4
6768210	Shri kiriti kumar Ray Chaudhuri, Bilaspur.	1 and 7
6768211	Shri D. V. V. Uppari Raju, New Delhi.	3 and 6
6768212	Shri Y. D. Desai. Virbhadra.	2 and 6
6768213	Shri, T. k. Balakrishnan Nair, Poona.	1 and 4
6768214	Shri S. B. kapadia, Baroda.	2 and 3
6768215	Shri Dipak Ranjan Ray, Calcutta.	3 and 6
6768216	Shri Prasanta kumar Basak, Calcutta.	1 and 8
6768217	Shri Amal kumar Bhowmick, Calcutta.	1 and 4
6768218	Shri Mohan Singh, Calcutta.	3 and 8
6768219	Madan Mohan Hati, Calcutta.	3 and 5
6768220	Shri Parimal Bikash Bhattacharya, Calcutta	4 and 6
6768221	Shri Nirmalendu Ghosh, Jamsedpur.	1 and 7
6768222	Shri Satya Ranjan Saha, Jamshedpur.	1 and 7
6768223	Shri Sanat kumar Pal, Howrah.	1 and 6
6768224	Shri Akhil Ratan Ghosh, Calcutta.	2 and 6
6768225	Shri Aswini kumar Dandapat, Durgapur.	1 and 7
6768226	Shri Manab Dutta, Calcutta.	1 and 6
6768227	Sm Vijay kumari Sohini, Hyderabad.	1 and 4
6768228	Shri Ashoke kumar Dey. Jamshedpur.	1 and 7
6768229	Shri Kalyan Das Gupta, 24 Parganas.	3 and 6
6768230	Shri Surinder Pal Puri, Rourkela.	4 and 5

Regd.	Names.	Sections.
6768231	Shri S. Rajagopalan, Calcutta.	4 and 8
6768232	Shri A. V. Kapoor, Jamnagar.	3 and 5
6768233	Shri Maya Dutta Sharma, Kasauli.	2 and 3
6768234	Shri Monoj Kumar Basu, Ranchi.	1 and 7
6768235	Shri K. Krishna Iyer, Bangalore.	1 and 8
6768236	Shri G. S. Chhatwal, Patiala.	6 and 9
6768237	Shri Subrata Samaddar, Calcutta.	4 and 6
6768238	Shri Suresh Chandra Sawhney, Haryana.	1 and 7
6768239	Shri B. V. Ramana Rao, Hyderabad.	2 and 8
6768240	Shri Dharendra Nath Dawn, Dhanbad.	4 and 7
6768241	Shri Subir Kumar Gupta, Dhanbad.	1 and 7
6768242	Shri P. Raghava Rao, Hyderabad.	4 and 7
6768243	Shri Sontosh Kumar Chandra, Dhanbad.	1 and 7
6768244	Shri Mohinder Nath Sharma, Rourkela.	1 and 7
6768245	Shri Tarak Nath Das, Calcutta.	1 and 4
6768246	Shri M. H. Ansari, Kanpur.	4 and 8
6768247	Shri Ved Prakash Malik, New Delhi.	3 and 6
6768248	Shri Dipak Kumar Dutta, Calcutta.	1 and 6
6768249	Shri Ram Prakash Sharma, Madras.	4 and 6
6768250	Shri Asoke Kumar Dutta, Dhanbad.	1 and 7
6768251	Shri Suresh Narayan Mathur, Hyderabad.	4 and 6
6768252	Shri Arun Bikash Chaudhury, Chittaranjan.	4 and 6
6768253	Shri Gyan Ranjan Dey, Chittaranjan.	4 and 6
6768254	Shri K. V. Sagar, Mysore.	3 and 5
6768255	Shri Shyam Sunder Sharma, New Delhi.	1 and 4
6768256	Shri Priya Ranjan Roy, Burdwan.	1 and 7
6768257	Shri S. Chandrasekharan, Madras.	3 and 6
6768258	Shri Satya Narayan Jha, Bhagalpur.	3 and 8
6768259	Shri Ramendu Das, Calcutta.	1 and 8
6768260	Shri Sudhanshu Ranjan Ghosh, Cuttack.	4 and 8
6768261	Shri Tapan Kumar Gupta, Rourkela.	4 and 7
6768262	Shri Wakeel Ahamed, Singbhum.	1 and 4
6768263	Shri Arun J. Potdar, Bombay.	1 and 2
6768264	Shri Satya Hari Mukhopadhyaya, Bilaspur.	1 and 7
6768265	Shri W. L. Lawrence, Trivandrum.	3 and 6
6768266	Shri Hari Pada Das, Dhanbad.	1 and 7
6768267	Shri S. Venkatesan, Rourkela.	4 and 7
6768268	Shri Bani Prasad Das, Dhanbad.	1 and 7
6768269	Shri Arun Kanti Talukdar, Meerut.	1 and 7

Regd. No.	Names.	Sections.
6768270	Shri Nisith Sen, Calcutta.	1 and 4
6768271	Shri Kalyan Kumar Basu, Calcutta.	1 and 4
6768272	Shri Ram Asre, Sibsagar.	4 and 8
6768273	Shri M. S. Kadhavan, Tatanagar.	1 and 7
6768274	Shri Satyadrata Ghosh, Dhanbad	1 and 7
6768275	Shri M. N. Patel, Madras.	3 and 6
6768276	Shri M. R. Sundaralingam, Dhanbad.	4 and 7
6768277	Shri S. B. Kitkaru, Nagpur.	1 and 7
6768278	Shri Prakash Singh, Delhi.	5 and 11
6768279	Shri Ranjit Kumar Saha, Calcutta.	4 and 10
6768280	Shri Surjit Kumar Narang, Assam.	4 and 8
6768281	Shri Sushil Kumar Dutta, Howrah.	1 and 6
6768282	Shri Rabindra Narayan Guha, Burdwan.	1 and 7
6768283	Shri J. B. Mulkarni, Hyderabad.	4 and 6
6768284	Shri Ranjan Babu, Durg.	4 and 8
6768285	Shri N. Viswanathan, Bombay.	4 and 7
6768286	Shri Ramesh Chandra Singhal, Calcutta.	3 and 8
6768287	Shri Paresh Nath Ray, Durgapur.	1 and 7

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I. S. N. Mitra, hereby declare that the particulars given above are true to the best of my knowledge and belief.

Dated March 1st, 1968

Sd. S. N. Mitra
 Printer, Publisher and Editor,

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At the meeting of the council held on 15th December, 1967 the following were elected Fellows, Associates and Members etc.

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| Dr. D. V. Ramana Rao, Rourkela. | " C. N. Kachru. Shrinagar |

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| Shri S. Shivahankar, Mysore. | " D. Sethu Rao, Maryland, U. S. A. |
| " Shri K. P. Shrestha, Nepal. | Shri G C, Mishra, Jorhat. |
| " C. V. Subba Rao, Hyderabad. | " Sankar Dass Popil, Chandigarh. |
| " I. S. Bhat. Thana. | " Y. K. Kalia, Jullundur City. |

Associates (By Examination) :

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| " Satyeswar Sahoo, Calcutta, | " Krishna K. Chatterjee, Calcutta. |
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| " Lt. Rajender Singh, Lucknow. | " Batuklal M. Shah, Baroda. |

Student Member :

- Shri M. Ponnaian, Madras.

